UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
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Seattle, WA 98115-0070

NMFS Tracking
No. 2002/00232

December 29, 2003

Thomas F. Mueller
Corps of Engineers
Regulatory Branch-CENWS-OD-RG
Post Office Box 3755
Seattle, Washington 98124-3755

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for West Lake Sammamish Elevated Community Walkway and Moorage Float (COE No. 1999-1-01746).

Dear Mr. Mueller:

The attached document transmits NOAA's National Marine Fisheries Service's (NOAA Fisheries) Biological Opinion (Opinion) and Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) consultation on the U.S. Army Corps of Engineers' (COE) proposed issuance of a 404 permit to West Sammamish Associates, LLC for a new elevated walkway, pier and float in Lake Sammamish. The consultations are in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1536), and section 305(b)(2) of the MSA (16 U.S.C.1855). The COE determined that the proposed actions are not likely to adversely affect Puget Sound chinook (*Oncorhynchus tshawytscha*) that occur under NOAA Fisheries' jurisdiction, and not likely to adversely affect EFH. NOAA Fisheries these conclusions.

This Opinion is the result of an analysis of effects of the proposal on Puget Sound chinook in Lake Sammamish. The Opinion and EFH consultations are based on information provided in the Biological Evaluation (BE) and other information sent to NOAA Fisheries by the COE on February 6, 2002, as well as additional information transmitted via telephone conversations, email, and fax. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

NOAA Fisheries concludes that implementation of the proposed projects is not likely to jeopardize the continued existence of Puget Sound chinook. In your review, please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take. NOAA Fisheries also concludes that the project will adversely affect EFH; conservation recommendations can be found at section 3.0 of the attached document.

If you have any questions regarding this correspondence or the attached document, please contact Kitty Nelson of the Washington Habitat Branch Office at (206) 526-4643.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: Suzy Lutey, USFWS
Kristina Tong, COE

Endangered Species Act - Section 7
Biological Opinion
and
Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

West Lake Sammamish LLC New Elevated Community
Walkway And Moorage Float
(Lakeshore Estates)
Redmond, Washington

Agency: U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service
Northwest Region

Date Issued: December 29, 2003

Issued By: For Michael R Crouse

D. Robert Lohn
Regional Administrator

NMFS Tracking No.: 2002/00232

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1.0 INTRODUCTION

1.1 Background Information

The United States Army Corps of Engineers (COE) proposes to issue permits under section 10 of the Rivers and Harbors Act and section 404 of the Federal Clean Water Act, that would allow construction of a new elevated community pier on the west shore of Lake Sammamish. This document has been prepared in response to a request from the COE for consultation under the Endangered Species Act of 1973 (ESA), as amended, 16 U.S.C. 1531, and the Essential Fish Habitat (EFH) requirement of the Magnuson-Stevens Fishery Conservation and Management (MSA), 16 U.S.C. 1855. This document transmits the NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and EFH consultation, based on our review of the effects of the proposed project.

1.2 Consultation History

On February 6, 2002, NOAA Fisheries received a Biological Evaluation (BE) and EFH Assessment from the COE, with a request for ESA section 7 informal consultation and EFH consultation for the West Lake Sammamish LLC (hereafter called Lakeshore Estates) new community elevated walkway and moorage float project (hereafter referred to as the new pier and float project).

The COE determined that the proposed project "may affect, [but is] not likely to adversely affect Puget Sound chinook and their designated critical habitat." Critical habitat designations on the West Coast were still in effect at that time. The COE stated that the letter initiating informal consultation would also serve to initiate formal consultation if NOAA Fisheries found the proposed action was likely to adversely affect Puget Sound chinook and their critical habitat.

The Opinion and EFH consultation is based on information in the final BE dated January 4, 2002, numerous phone calls and responses to NOAA Fisheries questions dated April 11, 2002, August 19, 2002, February 3, 2003, April 10, 2003, June 26, 2003 and July 10, 2003. On November 25, 2002, COE, United States Fish and Wildlife Service (USFWS) and NOAA Fisheries conducted a site visit. On June 24, 2003 a final meeting was held between the applicant, COE, and NOAA Fisheries. On June 26, 2003 formal consultation was initiated when the final design and construction elements of the project were sent to NOAA Fisheries.

1.3 Description of the Proposed Action

The Lakeshore Estates proposal is one to develop a new subdivision of 17 homes including treatment facilities for surface water, a new walkway, and a pier and moorage float located along the northwest shoreline of Lake Sammamish. The COE proposes to issue a permit that would authorize construction of a new pier and float and other shoreline modifications for cooperative use by the 17 new home owners and 17 existing condominium owners (Kennebec Condominiums) located to the west of the proposed construction site.

A boardwalk across a forested wetland will provide access from the condominium units to the proposed pier. The proposed pier project includes a ramp from the shoreline to the pier walkway, a 5-foot wide by 250-foot long fixed pier, a second ramp between the pier and the float, a 6-foot wide by 80-foot long float and pilings. The ramps will be 3-feet wide and the ramps and walkway will be fully grated. The float will include a 1-foot grate down the center. The original proposal included a 10-foot square pavilion for pedestrians to observe the shoreline at the base of the ramp leading to the pier, a 6-foot wide by 250 foot-long walkway, and a 6-foot wide by 450-foot long boardwalk across the forested wetland. During discussions with the COE, the applicant agreed to reduce the width of both the walkway and boardwalk to 5 feet, fully grate the walkway and both ramps (providing 69% open space) and eliminate the 10-foot square pavilion from the proposal.

As support structure for the pier, the applicant will drive a maximum of 32 six-inch diameter steel pilings into the substrate, using a vibratory hammer. The steel pilings will be spaced 18 to 20 feet apart. The bottom surface of the elevated walkway will be four feet above the ordinary high water (OHW) level, and the end of the float will be located in approximately 5 feet of water at OHW (COE datum).

The pier structure will be built with only a small of K-8 copper-8-quinolinolate treated wood and the surface of the walkway will be grated with aluminum grating that passes 69% incident light. Trex decking material is proposed for the float.

<u>1.3.1 Conservation Measures</u>

The applicant will remove four existing relic pilings, and will enhance 0.9 acres of buffer with appropriate vegetation, including 18 Douglas fir (*Pseudotsuga menziesii*), 18 western hemlock (*Tsuga heterophylla*), 23 western red cedar (*Thuja plicata*),102 Indian plum (*Oemleria cerasiformis*), 110 willow (*Salix spp*.) and 145 dogwood (*Cornus stolonifera*).

Sedimentation control measures, and the construction industry's best management practices, will be used during construction. The applicant will use a silt curtain and silt fences to control the amount of sediments that may reach the water. A hazardous spill management plan will be kept onsite. Spill cleanup and containment materials will also be onsite. The cleanup packets will include containment booms, materials designed to absorb petroleum, and plastic bags to be used for material transport.

The project (construction and conservation measures) are to be implemented between July 15 and December 31, to avoid effects to migrating and rearing chinook salmon.

<u>1.3.2 Construction Methods</u>

Construction period for the entire project will be about three weeks. Construction of the pier, ramps and float will be conducted from a barge. A silt containment barrier will be installed around the site and will be maintained in good working order for the duration of the shoreline work. An erosion control barrier will be installed landward of the OHW mark to prevent sediment generated from construction in the riparian area from reaching the water. The applicant will use a vibratory hammer to drive the pilings; installation will take only one to two days. The relic pilings will be removed by vibratory extraction.

1.4 Description of the Action Area

The ESA implementing regulations define "action area" as all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action (50 CFR 402.02(d)). The action area for this project includes the riparian buffer, and the open water and shoreline of Lake Sammamish because this area can be indirectly affected (by boating activity) from boats that will be moored at the new pier. Activities related to the proposed action would occur within a small portion of the range of chinook salmon, including rearing and migrating habitat along the perimeter of Lake Sammamish.

2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION

The objective of ESA consultation is to ensure that activities funded, authorized, or undertaken by a Federal agency, are not likely to jeopardize the continued existence of listed species, or destroy or adversely modify their critical habitat. Critical habitat is not currently designated for Puget Sound chinook, therefore, that analysis will not be presented in this document. The standards for determining jeopardy as described in section 7(a)(2) of the ESA are further defined in 50 CFR 402.14.

2.1 Evaluating the Proposed Action

In making its jeopardy analysis, NOAA Fisheries determines if the effects of the proposed action, together with the effects of the baseline and cumulative effects, will impair the listed species' potential to survive and recover. This analysis involves the initial steps of (1) defining the biological requirements, and (2) evaluating the relevance of the environmental baseline to the species' current status. NOAA Fisheries must then consider the estimated level of injury and mortality attributable to: (1) collective effects of the proposed or continuing action; (2) the environmental baseline; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery that occur beyond the action area. Significant impairment of recovery efforts or other adverse effects which rise to the level of "jeopardizing" the "continued existence" of a listed species can be the basis for issuing a "jeopardy" opinion (50 CFR 402.02).

2.1.1 Biological Requirements

The biological requirements of the Puget Sound Evolutionarily Significant Unit (ESU) of chinook salmon are those conditions necessary for the ESU to survive and recover to naturally reproducing population levels, at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become or continue to be self-sustaining in the natural environment. An ESU is a distinct population segment considered important to maintain the genetic diversity of a species, and is within the meaning of the term species, as defined by the ESA (16 U.S.C. 1532(16)).

The biological requirements for salmonids can be defined as habitats that have properly functioning conditions (PFC) relevant to any chinook life stage. NOAA Fisheries has determined that the specific habitat conditions affected by the proposed action are habitat structural complexity (submergent and emergent vegetation), riparian vegetation structure, water quality (chemical contamination from treated wood and outboard motor fuel), and interactions with non-native species.

During their residence in and migration through Lake Sammamish, juvenile chinook require refugia for resting, feeding, growth, and predator avoidance. Recent studies by United States Fish and Wildlife Service (USFWS) indicate that juvenile chinook prefer a diverse habitat including open water areas and areas with woody debris to meet these requirements (Tabor and Piaskowski 2001). The smallest juvenile chinook are found only along shallow shorelines with small substrates such as sand and gravel and used woody debris and overhanging vegetation as resting sites and for refuge from predators. As they grow, chinook avoid over-water structure, riprap and bulkheads, and move into deeper water.

2.1.2 Status of the Species

NOAA Fisheries completed a status review of chinook salmon from Washington, Idaho, Oregon, and California that identified fifteen distinct ESUs of chinook salmon in the region (Myers *et al.* 1998). After assessing information concerning chinook salmon abundance, distribution, population trends, risks, and protection efforts, NOAA Fisheries determined that chinook salmon in the Puget Sound ESU are at risk of becoming endangered in the foreseeable future. Subsequently, Puget Sound chinook salmon were listed as threatened (March 1999, 64 FR 14308). This listing includes all naturally spawning chinook salmon populations residing below natural barriers (e.g., long-standing, natural waterfalls) in the Puget Sound region from the North Fork Nooksack River to the Elwha River on the Olympic Peninsula, inclusive. In 2003, the estimates of trends in natural spawning escapements for Puget Sound chinook populations are similar to trends reported in the previous status review of Puget Sound chinook conducted with data through 1997 (BRT 2003). The long-term trends in abundance and population growth rates for naturally spawning populations of chinook in the Puget Sound ESU indicate that about half of the populations of chinook in Puget Sound are declining and half are increasing in abundance (BRT 2003). The long-term population growth rates indicate that most populations are just replacing themselves.

Historically, 31 quasi-independent populations of chinook comprised the Puget Sound ESU. Recently, the Puget Sound Technical Recovery Team (PSTRT), an independent scientific body convened by NOAA Fisheries to develop technical criteria and guidance for salmon delisting in Puget Sound, identified 22 geographically distinct populations of chinook salmon remaining in the Puget Sound ESU, including the Cedar River population (PSTRT 2001, 2002; BRT 2003). The populations that are presumed to be extirpated were mostly the early-returning chinook (spring-type chinook), and most of these fish returned to the mid to southern parts of Puget Sound, Hood Canal and the Strait of Juan de Fuca. The remaining 22 population designations are preliminary and may be revised based on additional information or findings of the PSTRT. Through the recovery planning process NOAA Fisheries will define how many and which naturally spawning populations of chinook salmon are necessary for the recovery of the ESU as a whole (McElhany *et al.* 2000).

The PSTRT has determined chinook in the north Lake Washington tributaries and the Cedar River are distinct from chinook in other Puget Sound streams and from each other (NMFS 2001). Analysis of genetic data suggest that the Cedar River chinook population is genetically divergent from the North Lake Washington population, and that chinook salmon sampled from Bear Creek and Issaquah Creek are genetically similar to each other (Marshall 2000).

2.1.2.1 Status of the Species in the Action Area

The 2003 Comprehensive Resource Chinook Management Plan categorizes Lake Washington chinook (North Lake Washington Tributary population) as a Category 2 population (NMFS 2003). Category 2 designations include areas where indigenous populations may no longer exist, but where sustainable populations existed historically (NMFS 2003). Category 2 populations typically occur in watersheds where the habitat has been significantly degraded. In many of these systems, such as Issaquah Creek, hatchery and natural fish are currently inseparable on the spawning grounds. The level of natural spawning in these streams may largely reflect production and escapement of hatchery origin fish. The objective for Category 2 populations is to use the most locally-adapted population to reestablish naturally-sustainable populations. The co-managers' goal of harvest management is to provide sufficient escapement to the spawning grounds to increase natural productivity (NMFS 2003).

The North Lake Washington population includes tributaries to the Sammamish River, including Bear Creek and Issaquah Creek (Seiler *et al.* 2003). Chinook spawn naturally in Issaquah Creek and the East Fork Issaquah Creek. These juveniles migrate with hatchery produced juveniles and other juveniles produced from North Lake Washington tributaries (e.g. Bear Creek) to Puget Sound. The naturally spawned chinook that travel through Lake Sammamish include progeny of hatchery salmon that strayed to the spawning grounds. Naturally reproduced juveniles migrating from Issaquah Creek and the East Fork Issaquah Creek (hereafter referred to as Lake Washington chinook) and returning spawners are the population of special concern in this consultation.

In contrast to chinook production from the Cedar River and Bear Creek, nearly all of the naturally produced chinook originating from Issaquah Creek are thought to be from progeny of hatchery adults (Seiler *et al.* 2003). Issaquah Hatchery has been releasing chinook salmon since 1937 and currently releases nearly two million age zero plus chinook each year during the end of May and early June (John Kugen, fish hatchery specialist, Issaquah Hatchery, pers. comm., July

10, 2003). Consequently, more chinook spawners return to Issaquah Creek than to either the Cedar River or Bear Creek. In 2002 the Issaquah Hatchery allowed more than 3,180 chinook spawners upstream of the hatchery to spawn naturally in the stream (Larry Klub, manager, Issaquah Hatchery, pers. comm., October 28, 2002). From March 15, 2000 to July 3, 2000, wild chinook production in Issaquah Creek was estimated at 30,000 juveniles (Seiler *et al.* 2003) with actual juvenile production higher. Chinook fry are thought to leave Issaquah Creek and enter Lake Sammamish in January similar in timing to fry migration from the Cedar River into Lake Washington (Dave Seiler, fisheries biologist, WDFW, pers. comm., July 10, 2003).

Chinook smolts migrate and rear in Lake Sammamish from five days to a month or more and may residualize in Lake Sammamish (Hans Berge, fisheries biologist, pers. comm., July 9, 2003). Berge observed hatchery and wild chinook enter Lake Sammamish and distribute themselves along the shoreline (the littoral zone) and in the top ten feet of the water column (in the pelagic zone) at the mouth of Issaquah Creek on May 29, 2003 through May 31, 2003. The Issaquah Hatchery released chinook at this time but Berge observed 10-15% of the juvenile chinook had adipose fins intact and were smaller in size, both signs that they were not hatchery chinook.

Predators,including yellow perch (Brian Footen, fisheries biologist, MIT, pers.comm., July 14, 2003), cutthroat trout and various species of mergansers, cormorants and seagulls apparently move to the south end of the lake when the hatchery fish are released, to feed on the abundant food source (Dan Estelle, WDFW, pers. comm., July 10, 2003). Naturally produced chinook may derive some benefit against predation by being obscured in large numbers of hatchery released salmon, when migrating during late May and June.

In summary, naturally produced chinook migrate from Issaquah Creek to Lake Sammamish from January through July, where they use the shoreline for rearing before migrating to Lake Washington and Puget Sound

2.1.3 Environmental Baseline

The environmental baseline is the current set of conditions to which the effects of the proposed action will be added. The term "environmental baseline" means "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process" (50 CFR 402.02).

Since settlers arrived in the Sammamish River Valley,the system's hydrology, floodplain, and aquatic and terrestrial habitats (Tetra Tech 2002) have significantly changed. Bowers noted that "development of the shoreline of Lake Sammamish has reduced the once abundant overhanging vegetation and woody debris." Trees along the shore of Lake Sammamish were so dense that when water levels were high "it [was] difficult to walk any distance along the shore without swinging from one bough of a tree to another" (Bowers 1898). The heaviest logging activity occurred from the 1880s through about 1900.

In 1916, construction of the Hiram M. Chittenden Locks changed the hydrology of Lake Sammamish so that the elevation of the lake surface was lowered by six feet and the wetland complex that formed the Sammamish River corridor dried up. Sometime before 1950 the Sammamish River was dredged for navigation purposes (Ajwani 1956). The final major alteration to the river channel was completed in 1964 to reduce flooding and included additional straightening, channelization, and dredging (Tetra Tech 2002). The Sammamish River has lost approximately 16 river miles of length, most off-channel rearing habitat, its floodplain, and most of its riparian vegetation (Tetra Tech 2002). As water temperatures rise during the summer the river is a substantial thermal migration-barrier to adult spawners (Kahler 2000). The Sammamish River begins at the north end of Lake Sammamish and connects Lake Sammamish to Lake Washington.

Lake Sammamish is the second largest lake in King County (KC) and is like a fjord with a long uniform trough and steeply sloping sides but is not as deep as most fjord lakes. Lake Sammamish is approximately 8 miles long and 1.2 miles wide with a surface area of 4,897 acres, a maximum depth of 105 feet and a mean depth of 58 feet (KC 2003). Bottom substrates are composed primarily of gravel and cobble (Pflug 1981). The southern and northern ends of the lake have shallow slopes, silt and sand substrates with dense growths of aquatic vegetation (Pflug 1981).

Lake Sammamish thermally stratifies from late May to mid-November when conditions for salmonids in some parts of the lake can be lethal. During 1998 maximum temperatures occurred in early August when the surface temperature rose to 24.3 degrees Centigrade. During the fall, dissolved oxygen levels dropped precipitously so that by early November dissolved oxygen was less than 1 milligram per liter at depths greater than 45 feet (Beauchamp *et al.* 2002).

Although non-point source phosphorus entering the lake from run-off had increased from about 13 micrograms per liter in 1978 to 22 micrograms per liter in 1996 (KC 2002) recent monitoring data has shown a decline in total phosphorus concentrations in the lake. (Kerwin 2001). Alkalinity and pH levels have increased over this period, too. Contamination of the lake from pesticides and metals from non-point run-off and stormwater is also a concern. Substrates in selected areas of Lake Sammamish contain elevated concentrations of sediment-associated contaminants although sediment quality is generally good (Kerwin 2001).

The major tributary to Lake Sammamish is Issaquah Creek which enters at the south end and contributes approximately 70% of the surface flow. Tibbetts Creek on the southeast end of the lake and Pine Lake Creek entering on the central east side of the lake contribute about six percent and three percent respectively. Water discharges from Lake Sammamish through the Sammamish River at the north end of the lake, where a low flow control weir at Marymoor Park controls the discharge to the Sammamish River. The weir was constructed in the Sammamish River to prevent the lake from draining too low in the summer (Tetra Tech 2002). Thus, the water elevation of Lake Sammamish is artificially maintained although to a lesser extent than

Lake Washington's hydrology. The high water level and low water level follows a natural regime in Lake Sammamish (high water lake levels occur during the winter time and low water levels occur during the summer and early fall), however, the weir may be a temporary passage barrier for adult salmonids into Lake Sammamish during the fall migration time when flows are typically low (Kerwin 2001).

The OHW elevation of Lake Sammamish was determined by the COE to be 27.0 feet although water levels commonly reach much higher elevations. According to USGS data collected over the past 35 years the elevation of annual high water events appears to be closer to 28 to 29 feet. This discrepancy affects how piers in the lake have been constructed and also affects fish habitat. Many piers are submerged during the rainy season because setbacks for construction are measured from the OHW of 27.0 feet (COE Datum). Reliance on the lower OHW elevation allows development to occur much closer to the water and results in construction of bulkheads to protect homes from wave action and a reduction in the riparian area next to the shoreline. The riparian area that supports shoreline structure and processes important in sustaining fish habitat is reduced.

The lake is surrounded primarily by suburban homes and large landscaped yards (Kerwin 2001). The full extent of bulkhead and pier construction for the entire lake is unknown, however, many of the residences around Lake Sammamish have piers and bulkheads or retaining walls associated with them. A general survey of the shoreline from the proposed project to the south end of Weber Point revealed a total of 13 piers along a half mile of shoreline, or one pier every 200 feet.

Non-native species are changing the density and diversity of plants in and around Lake Sammamish. Eurasian water milfoil (*Myriophyllum spicatum*), an invasive aquatic plant, has replaced native vegetation in many areas of the lake (Kerwin 2001) and annual periods of plant die-off and decay can reduce dissolved oxygen levels below the minimum requirement for salmonids (Frodge *et al.*1995). At the north end of the lake another non-native, the fragrant water lily (*Nymphaea odorata*) is found in large expanses. Excessive non-native macrophyte growth may decrease available littoral habitat for some aquatic species like juvenile chinook that are shoreline dependent. Macrophytes may also provide a refuge for predators such as largemouth bass (*Micropterus salmoides*). Non-native fish introduced into Lake Sammamish include eastern brook trout (*Salvelinus fontinalis*), largemouth and smallmouth bass (*Micropterus dolomieui*), yellow perch (*Perca flavescens*), lake trout (*Salvelinus namaycush*), brown bullhead (*Ictalurus nebulosus*), black crappie (*Pomoxis nigromaculatus*), and pumpkinseed sunfish (*Lepomis gibbosus*) (Ajwani 1956, Beauchamp *et al.* 2002). The loss and alteration of littoral habitat and introduction of non-native species has produced an overall change in species composition and shifts the dynamics of fish predation (Kerwin 2001).

2.1.3.1 Factors Affecting Species in the Action Area

Probable causes of decline for chinook abundance in Lake Sammamish include changes in fish species composition, predation, degraded riparian habitats and water quality (Overman 2002).

Changes in sediment quality, sediment transport, macrophyte conditions, and introduction of exotic plants may also contribute to the decline. Habitat impacts that are applicable to the action area are loss of large woody debris (LWD) and blockage or passage problems associated with dams or other structures (March 9, 1998, 64 FR. 11494). Land use activities associated with urban development have substantially altered fish habitat quantity and quality (Myers *et al.* 1998). Impacts associated with urban development include elimination of rearing habitat, removal of vegetation, and elimination of LWD recruitment (Myers *et al.* 1998).

2.1.4 Relevance of Baseline to Status of the Species

The biological requirements of the listed species are not being met under the baseline conditions in the action area. The factors for decline that contributed to the need for listing the ESU continue to be present in the action area as baseline conditions. The long-term declines in distribution and abundance of chinook are attributed to significant historic structural and hydrologic changes, water withdrawals and impoundments, urbanization, habitat degradation, and habitat accessibility in the action area and throughout the watershed.

Continuing development on the shoreline in the action are adding effects to salmonid habitat, such as changes to shoreline vegetation and riparian structure, substrate composition, structural complexity, habitat access, non-native species and chemical contamination through the use of treated wood. To improve the status of chinook, improvements over current conditions in both the quality and quantity of the species' habitat are needed to support chinook migration and rearing activities (increasing survival).

Restoring functional conditions along the shoreline would allow the natural processes that enable habitat formation and water quality maintenance, both of which are necessary to sustain fish. Specifically, riparian vegetation, in-water vegetation, and woody debris need to be re-established in and around the shoreline. Additionally, because armoring of the shoreline changes shoreline gradients and sediment supplies to the lake (decreasing the amount of shallow water habitat and appropriately sized substrate), a reduction in structural armoring is necessary to re-establish the shoreline conditions that juvenile salmon prefer. Moreover, care must be taken to avoid improving habitat for non-native species that inhabit the lake, which can compete with juvenile salmon for food or prey upon juvenile chinook as they rear in and migrate through the lake.

2.2 Effects of the Proposed Action

The ESA implementing regulations define the "effects of the action" as "the direct and indirect effects of an action on threatened or endangered species or habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline" (50 CFR 402.02). These effects, when added to the effects on listed species from the baseline condition, and cumulative effects, are analyzed to determine whether or not a project will jeopardize the continued existence of a listed species.

2.2.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated as they would be the subject of future consultation under ESA section 7.

Direct effects of new piers and floats include those from shade from the new float and moored boats, shoreline modification where the pier is connected to land, water quality impacts from turbidity during construction and pile-driving noise.

2.2.1.1 Shade and Structure

The effects on juvenile chinook of shade and structure produced by piers and floats in Lake Sammamish are not well understood, but some recent observations have been made of chinook behavior around piers. Tabor and Piaskowski (2001) reported chinook fry utilize overwater structure during the day but that larger juvenile chinook avoided over-water structure at night and during the day. In Lake Washington during June 2003, schools of migrating chinook moved offshore from shallow to deeper water before swimming under a solid dock (Roger Tabor, USFWS, personal communication, October 8, 2003). The change in orientation is probably stimulated by the change in light level below the dock.

The float will be located in about 5 feet of water beyond the edge of an extensive bed of primarily non-native pond lilies. The float will be oriented parallel to the shoreline. Each float is supported by a set of tubs filled with closed-cell high-density foam. The tubs extend into the water 12 to 14 inches, and when fully loaded will displace an additional 14 inches of water. The float when loaded could extend into the water more than two feet (40% of the available water depth). As a consequence chinook migration could be blocked by the float structure. The float support, therefore, will reduce the amount of vertical space (habitat) in the water column for fish, in addition to producing shade for the entire length of the float. At the construction site the lake narrows to form the Sammamish River. If fish migrate in the open water beyond the pond lilies, the float may force fish out to deeper water which contains more predators, such as cutthroat trout. The float might also improve habitat conditions (shade and structure) that are favorable to non-native predators such as largemouth bass (Helfman 1979, Pflug 1981). The installation of the float will reduce existing open-water habitat that salmon prefer, and create structure that migrating salmon may avoid. Therefore, installation of the float may be detrimental for chinook.

The walkway through the forested wetland will be only 5 feet wide in order to minimize impacts to the riparian area. The ramp and fixed pier walkway are fully grated (69% open space) and the walkway is elevated 4 feet above the existing OHW (27.0 feet COE Datum) to reduce shade. The ramp leading to the float will be 3 feet wide and grated to minimize shade impacts. Shade produced by the pier structure is minimized by grating, height above the water and narrow width. However, boats moored next to the float will produce shade. Effects of such shading to juvenile chinook are uncertain but may be detrimental.

2.2.1.2 Shoreline Modification

The construction of the 450-foot boardwalk in the riparian zone and wetland buffer will alter at least 2,250 square feet of riparian area. The applicant proposes to replace non-native plants with native vegetation in approximately 0.9 acres of wetland buffer inland from the shoreline to reduce impacts for 0.16 acre of wetland disturbance in the buffer leading to the shoreline. Construction of the boardwalk will alter currently undeveloped land for the life of the project, which can reasonably be expected to extend a minimum of thirty years. The 30-foot ramp to the elevated pier will be elevated above the ground some distance, reducing disturbance to vegetation.

2.2.1.3 Water Quality

The pier and float construction and presence may slightly degrade water quality. Installing the pier will mobilize sediments in the water column, temporarily increasing turbidity levels in the immediate vicinity (several feet) of the construction activities. The level of turbidity would likely exceed the natural background levels. However, this condition will be short-lived, and have a low potential for causing harm to chinook, because the spatial scale of the pier installation will be small and restrictions on piling spacing will limit the overall number of pilings installed reducing the area in which salmon might be exposed to turbid conditions. Moreover, installation will occur when listed species are least likely to be present near the project site, reducing the likelihood of their exposure to turbid conditions.

Some types of treated wood in piers and ramps may release contaminants. However, copper-8-quinolinolate does not contain carcinogens, arsenic and cadmium that are common in other wood preservatives. The pH, alkalinity and dissolved organic carbon concentrations that occur in Lake Sammamish will significantly reduce the bioavailability of any copper that may leach from the small amount of treated wood to be used in the structure. Therefore, NOAA Fisheries expects that exposure to contaminants as a result of this project will have discountable and insignificant effects to chinook salmon.

An interrelated action of the proposed project is the surface water discharge from the 17 unit housing complex to the wetland buffer. Water quality treatment will be provided in a wetpond designed to the Sensitive Lake Protection Menu of the 1998 King County Surface Water Design Manual (Marc Boule, project consultant, pers. comm., May 21, 2003). The large wetpond will remove 50% of the annual average total phosphorus. Events above the six-month storm will be bypassed around the wetpond through an overflow weir at the wetland buffer edge, and will be filtered through vegetation in the buffer to remove phosphorus and other pollutants before reaching the lake.

In summary, turbidity from pile driving is not expected to harm listed chinook, but the operation of boats at the pier site, and stormwater discharges from the adjacent upland development, may slightly degrade water quality. Effects to chinook salmon from this low level degradation are not expected to be appreciable.

2.2.1.4 Pile-Driving Noise

Pile driving, especially with a drop-hammer, typically causes temporary, intense under-water noise. Drop-hammers produce sharp spikes of sound that can easily reach levels that harm fish. The extent to which the noise will disturb fishes is related to the distance from the sound source, size of hammer and pilings, and affected species, as well as the duration and intensity of the pile-driving operation. The noise caused by drop-hammer pile-driving would likely elicit a startle response from chinook near the sound source. After the initial strikes, the startle response wanes and the fish may remain within the field of a potentially-harmful sound (Dolat 1997; NMFS 2002). Salmonids may be physically harmed by peak sound pressure levels that exceed 180 dB (re: 1 micropascal), while behavior may be disrupted at sound pressure levels that exceed 150 dB (re: 1 micropascal) (NMFS 2002).

For the proposed actions, pile-driving sound is expected to have little impact on listed fish because the applicant will install the piles with a vibratory pile driver to install small diamater piling (six inches). Pilings will be installed over a short time period within the COE/NOAA Fisheries/USFWS designated work window when listed species are least likely to be present near the project site.

2.2.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects might include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or be a logical extension of the proposed action (50 CFR 402.02).

2.2.2.1 Predation

Predation is an important mortality agent throughout the life cycle of salmonids. Many interdependent factors affect the magnitude of predation, including the characteristics of prey and predators, and habitat characteristics. Piscivorous fish are generally considered to be the most important predators of juvenile salmon (Healey 1991).

Lake Sammamish has a diverse and abundant piscivorous community including yellow perch, cutthroat trout (*Oncorhynchus clarki clarki*), and the non-native smallmouth bass (Footen and Tabor 2003). During the spring, juvenile chinook composed 25% of the wet weight diet of yellow perch. In late May, over 50% of perch, cutthroat and smallmouth bass diets are chinook and unidentified smolts. Numerous predators are expected to occur at the project location. The proposed float and pier are to be located in an area where listed salmonids migrate and rear, and where largemouth bass are highly likely to be found. The spatial and temporal overlap between largemouth bass and chinook in the nearshore, and the vegetative habitat preference of largemouth bass, creates a concern about predation on juvenile chinook at this location. Predation by largemouth bass, and possibly other species, may also be enhanced because the float will be constructed in shallow water (five feet). While NOAA Fisheries is not aware of any studies that have specifically determined impacts of floating structures on salmon, predation is likely to occur near these structures (Helfman 1979). For instance, Stein (1970) frequently found largemouth bass under piers in his study of largemouth bass in Lake Washington.

Light plays an important role in defense from predation. Prey species are better able to see predators under high light intensity, thus providing the prey species with a relative advantage (Hobson 1979). Petersen and Gadomski (1994) found that predator success was higher at lower light intensities. Howick and O'Brien (1983) found that in high light intensities, prey species (bluegill) can locate largemouth bass before they are seen by largemouth bass. However, in low light intensities, the largemouth bass can locate the prey before they are seen. Walters *et al.* (1991) found that high light intensities may result in increased use of shade producing structures by predators.

Largemouth bass inhabit vegetated areas, open water, and areas with cover such as piers and submerged trees (Mesing and Wicker 1986). Adult largemouth bass in a lake are generally found near submerged structures suitable for ambush feeding (Wanjala *et al.* 1986) and in lakes lacking vegetation largemouth bass prefer habitat associated with piers (Colle *et al.* 1989). Over-water structures like floats create a light/dark interface that allows ambush predators to remain in the darkened area (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around structure are more susceptible to predation because they are unable to see predators in the dark area under the structure.

Peak spawning for both largemouth and smallmouth bass occurs in May and June, when juvenile salmonids are rearing and migrating in the littoral areas. Of the anadromous salmonids that use the littoral zone, juvenile chinook are most at risk to bass predation (Fresh *et al.* 2001). Chinook are vulnerabe to predation because the timing of bass migration into the littoral area of the lake coincides with the peak occurrence of juvenile chinook salmon in this habitat (Fresh *et al.* 2001). Pflug found that during May, both bass species showed a strong preference for salmonid smolts during his study (Pflug 1981). In Lake Sammamish, juvenile salmon are especially important food sources for both bass species during periods of salmon outmigration (Overman 2002). Although both smallmouth and largemouth consumed similar food items, including insects, crayfish and prey fish, salmonids comprised a higher percentage of largemouth bass diets (Overman 2002).

While the relative roles and extent that additional in- and over-water structure and reduced light play in benefitting predaceous fish is unknown, NOAA Fisheries finds that the scientific literature and recent studies regarding predator/prey behavior indicate the addition of in/over-water structures such as piers and floats might increase predator success.

The proposed new pier will add approximately 2,000 square feet of overwater coverage and

32 new pilings. The additional structure and shade from the proposal changes habitat in favor of non-native predators. Although the use of small diameter pilings spaced at least 18-feet apart are expected to minimize structure-dependent benefits to predaceous fish, the float will extend shade further out into the lake, modifying existing open water habitat. The depth will still be shallow (five feet) at the location where the float will be installed. The proposed design is expected to minimize the potential impact on wild chinook.

2.2.2.2 Littoral Productivity

The pier and float will also have general effects to littoral productivity. The shade from the structures may reduce the growth of non-native aquatic macrophytes, such as Eurasian water milfoil and white pond lily, but will also reduce growth of native macrophytes, algae, and phytoplankton. At a minimum, shade from the pier and float might affect the overall productivity of littoral environments (White 1975; Kahler *et al.* 2000) and to an uncertain degree, affect listed chinook through changes in productivity and trophic interactions.

2.2.2.3 Boating Activity

The new community pier will increase the amount of boating activity in the lake. Boating activity can have several impacts on listed salmonids and aquatic habitat. Engine noise, propellor wash, and the physical structure of boat hulls might disturb or displace nearby fish (Mueller 1980; Warrington 1999a). Boat traffic can cause: (1) increased turbidity in shallow waters; (2) uprooting of native aquatic macrophytes in shallow waters; (3) shoreline erosion (Warrington 1999b); and (4) aquatic pollution (through exhaust, fuel spills, or release of petroleum lubricants). These boating impacts indirectly affect listed fish in a number of ways, though the degree of these effects is unknown.

Turbidity, as described above, may injure or stress affected fishes by clogging their gills with fine particles. Uprooting of aquatic macrophytes can reduce available refuge for juveniles in shallow water, as well as reduce the prey base that depends on the macrophytic vegetation. Increased wave action could displace juveniles from feeding along the shoreline, cause wave-throw of juveniles onto the shore, and increase shoreline erosion, steepening the shore and deepening the water, allowing predators easier access to juvenile salmonids.

Pollution may also affect fish by impacting potential prey species or aquatic vegetation. Two-cycle outboard motors will discharge oil and gasoline, degrading water quality in the action area. Polycyclic aromatic hydrocarbons (PAHs) are commonly released from petroleum based contaminants used in outboard motors such as fuel, oil, and some petroleum-based hydraulic fluids. While PAHs at high levels of exposure, can cause lethal as well as acute and chronic sublethal effects to aquatic organisms (Neff 1985), and may cause a variety of harmful effects (cancer, reproductive anomalies, immune dysfunction, and growth and development impairment) to exposed fish (Johnson 2000; Johnson *et al.* 1999; Stehr *et al.* 2000), boating activities at this structure are not expected to create PAH exposure at levels that could produce these results.

2.3 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Continuing development on the shoreline within the geographic range of the ESU area will contribute additional effects to salmonid habitat such as changes to: (1) shoreline vegetation and riparian structure; (2) substrate composition; (3) structural complexity; (4) habitat access; (5) non-native species abundance and composition; and (6) chemical contamination of habitat through the use of treated wood in unpermitted projects. In the action area for this project, NOAA Fisheries does not expect extensive riparian buffer degradation, because all of the land is either currently developed for residential or commercial purposes, or is publicly owned and used as park land.

2.4 Conclusion

NOAA Fisheries concludes that the proposed action, considered together with effects from the baseline and cumulative effects, is not likely to jeopardize the continued existence of Puget Sound chinook. NOAA Fisheries bases its conclusion on the fact that, while the construction and installation of the proposed pier will slightly degrade some baseline habitat functions locally, it will not appreciably further reduce the function of the already impaired habitat or retard the long-term progress of impaired habitat towards PFC at the ESU scale. The non-jeopardy determination is based on the applicant's use of improved design criteria incorporating the following features: (1) walkway and ramps fully grated with a surface that allow 69% light transmittal to minimize added shade; (2) walkway elevated a minimum of 4 feet above the OHW COE Datum to minimize added shade; and (3) a limited number of small diameter steel pilings to minimize added structure.

Project components that improve habitat conditions for listed chinook are: (1) vegetative riparian improvements; and (2) the removal of existing, relic pilings that might be functioning as habitat for predators in the proposed action area.

Because the elements of the project that will harm fish are minimized, other components of the proposed project will incrementally improve riparian vegetation, and the ultimate effect of adding shade and structure is uncertain as to whether it will foster increased predator use in this location or improve conditions by shading out the extensive amount of invasive aquatics, NOAA Fisheries concludes that the proposed project, in total, will minimize damage to conditions required for the survival of the Lake Washington wild chinook population.

2.5 Reinitiation of Consultation

As provided in 50 CFR 402.16, where discretionary Federal agency involvement or control over the action has been retained by the Action Agency (or is authorized by law), consultation must be reinitiated if: the amount or extent of incidental take is exceeded; new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this Opinion; the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The applicant, by carrying out the action as described, will add approximately 2,000 square feet of over-water structure (including the float) and 30 cubic feet of in-water piling structure, and will enhance 0.9 acres of riparian habitat that buffers the lakeshore and an adjacent wetland. If the extent of construction should exceed these limits, or the enhancement not be fully implemented, effects not previously considered would result, work must stop, and the COE must reinitiate consultation.

2.6 Incidental Take Statement

Section 9 of the ESA prohibits the take of endangered species. Section 4 extends the prohibition to threatened species through regulation (see 50 CFR 223.203). "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Harass" is defined as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3).

"Incidental take" is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. An incidental take statement provided under ESA section 7(b)(v), specifies the impact of any incidental taking of endangered or threatened species, provides reasonable and prudent measures (RPMs) that are necessary to minimize such impact, and sets forth terms and conditions with which the action agency or the applicant must comply in order to implement the reasonable and prudent measures. Section 7(o)(2) of the ESA states that take that is in compliance with the terms and conditions specified in an incidental take statement is not considered prohibited take.

2.6.1 Amount or Extent of the Take

Listed chinook use the action area for migration and rearing activities, and some juveniles residualize in Lake Sammamish. Because listed chinook are present at all times of the year these listed fish are reasonably likely to encounter either effects from the construction, the effects of permanent alteration in their habitat, or both. Therefore, despite measures included in the proposed action to reduce the likelihood of it occurring, take is reasonably likely to occur incidental to the proposed action.

Because fish presence is dependent upon a variety of fluctuating factors, such as age, size, prey availability, etc., NOAA Fisheries cannot estimate the number of fish that would be present in the action area or the project site either during construction or in subsequent years, despite the use of the best scientific and commercial data available. Therefore NOAA Fisheries cannot estimate the number of chinook that may be taken as a consequence of this project.

NOAA Fisheries believes take of listed chinook will be in the form of harm, resulting from detrimental habitat modification resulting from the walkway, pier and float construction. The spatial extent of these environmental changes to fish habitat serves as a surrogate for estimating the amount of take. As such, the following spatial estimates of habitat impact represent the limits on incidental take that are anticipated in this biological opinion: the proposed action will add approximately 2,000 square feet of over-water structure (including the float) and 30 cubic feet of in-water piling structure.

2.6.2 Reasonable and Prudent Measures

The RPMs to minimize the impact of take from the proposed project are described below. The RPMs are non-discretionary; for the exemption in section 7(o)(2) to apply, the COE, the applicant, or both, must implement them by carrying out the terms and conditions described in the following subsection. The COE has a continuing duty to regulate the activity covered in this incidental take statement. If the COE fails to retain the oversight to ensure compliance with the terms and conditions, the protective coverage of section 7(o)(2) may lapse.

NOAA Fisheries believes the following RPMs are necessary and appropriate to minimize take of chinook.

1. The COE will further minimize take from shade and structure; and
2. The COE will minimize take by ensuring that habitat functions are not degraded by permitted projects.

2.6.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the prohibitions of ESA section 9, the COE must comply with the Terms and Conditions that implement the Reasonable and Prudent Measures. These terms and conditions are nondiscretionary.

These measures shall be integrated into the project design and construction activities and shall ensure that:

1. To implement RPM No. 1, the COE shall reduce the extent and quality of aquatic predator (shade) habitat by ensuring that the non-native water lily (*Nymphaea odorata*), be eradicated by mechanical means in front of, and across the full width of the property, before the pier is constructed, and maintain this condition over the life of the pier. Native spatterdock (*Nuphar polysepala*) will not be removed from the site.

2. To implement RPM No. 2, the COE shall:

   a. Annually for a period of five years, submit to NOAA vegetation monitoring report to document successful removal of *Nymphaea odorata* and successful establishment of enhanced riparian vegetation. The report shall include photos taken from the same locations during the summer and winter months. The reports shall be received by NOAA Fisheries no later than March 31 for each year of the monitoring period.

   b. Ensure that riparian vegetation enhancement plans have achieved at least 80% planting survival at five years, by replacing dead plants annually for the five-year period.

   c. Provide access to the pier/float to NOAA Fisheries for the purposes of gathering data for light transmission through the pier/float, fish use, and eradication of the non-native pond lily.

2.7 Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out programs for the conservation of endangered and threatened species. The conservation recommendations provided here are discretionary agency activities to designed to minimize or avoid adverse effects of agency actions on listed species, or critical habitat where applicable, to help implement recovery plans, or to develop additional information.

NOAA Fisheries encourages the COE to evaluate the effectiveness for juvenile chinook of the removal of non-native vegetation associated with COE permitted projects. Further, NOAA Fisheries encourages the COE to explore the use of its permit authorities in a manner that improves salmonid habitat and ecosystem function in the action area to compensate for habitat impacts associated with piers and boating activity. Lastly, NOAA Fisheries encourages the use of four-stroke engines in boating to reduce pollution risk.

NOAA Fisheries requests notification should any of these conservation recommendations be implemented, so that additional actions minimizing or avoiding adverse effects of the project or benefitting listed species or their habitats can be recorded.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or state action that would adversely affect EFH (section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (Section 305(b)(4)(B)).

Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Essential Fish Habitat consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.* natural waterfalls in existence for several hundred years) (PFMC 1999). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999; see: http://www.pcouncil.org/salmon/salother/a14.html). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in section 1.3 and 1.4 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in section 2.2 of the Opinion, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

1. Habitat modification (shade) detrimental for salmonids.

2. Decrease in water quality from pier construction and boat operations.

3. Increased underwater noise associated with pile driving in the vicinity of the project.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for chinook and coho salmon.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BE will be implemented by the COE, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. NOAA Fisheries believes that adverse effects to the nearshore and riparian areas are minimized to the maximum extent practicable, by the conservation measures described in the BE and therefore has no additional conservation recommendations. To minimize the remaining adverse and aggregate effects to designated EFH for Pacific salmon (shade, structure, water quality, noise), NOAA Fisheries urges that the COE implement the following recommendations:

1. To minimize the adverse effect of modifying habitat the COE should ensure that the non-native water lily (*Nymphaea odorata)* be eradicated by mechanical means before the pier is constructed and maintain this condition over the life of the pier.

2. To ensure the success of vegetation plans proposed, the COE should monitor the riparian mitigation and eradication of *Nymphaea odorata*.

3. The COE should ensure that vegetation plans have achieved at least 80% planting survival by replacing any dead plants found during the five years of monitoring.

3.7 Statutory Response Requirement

Pursuant to the MSA (section 305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(k)).

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Attachment 1

Lake Matrix of Pathways and Indicators for Lake Washington, Lake Sammamish, and the Ship Canal, including Lake Union

Draft 3/11/03

Pathway	Indicators	Properly Functioning (PFC)	At risk	Not Properly Functioning (NPF)	Source
Water Quality	Temperature/DissolvedOxygen (DO)	At least 50% of water column is <14 C and >5mg/l	Entire water column between 14-18 C and DO between 3-5 mg/l	No portion of water column <18 C or DO less than 3 mg/l	
	pH	6.5-8.5	_	_	WA ST WQ Standards
	Chemical Contamination	Low levels of chemical contamination from agricultural, industrial or private residences, and watercraft, no creosoted or treated wood on site, no pesticide use	Moderate levels of chemical contamination from agricultural, industrial or private residences and watercraft, low amount creosoted or treated wood on site, low amount pesticide use	High levels of chemical contamination from agricultural, industrial or private residences and watercraft, medium to high amount creosoted or treated wood on site, medium to high pesticide use	FW matrix
	Nutrients Total Phosphorous (TP)	No excess nutrients, <10 ppm TP in epilimnion	Some excess nutrients, 10-15 TP in epilimnion	High levels of excess nutrients, >15TP in epilimnion	FW matrix

Habitat Access	Physical Barriers	Fish passage is unimpeded into, through or out of lake at all lake levels	Any man-made barrier that does not allow fish passage through the lake or upstream and /or downstream at any lake level	Any man-made barrier that does not allow fish passage through the lake or upstream and/or downstream at any lake level	FW matrix
Habitat Elements	Non-Native Species (in water-plants and animals)	Diverse plant community dominated by native species/no non-native predation pressure	Co dominance (50%) of non-native and native species/some non-native predation pressure	Non-native plants >80%, moderate non-native predation pressure	
	Shoreline upwelling	No reduction of shorezone upwelling	Any reduction of shorezone upwelling	Elimination of shorezone upwelling	
	Structural complexity (includes woody debris, submergent and emergent vegetation)	Woody debris abundant, diverse submergent and emergent community,	No woody debris	No woody debris, contiguous surface canopy	Bowers 1898
	Substrate composition	No change from natural state, no contaminated sediments	Altered from natural substrate, no contaminated sediments	Significantly altered substrate and/or contaminated sediments	
Shoreline Conditions	Shoreline vegetation and	1 site potential tree height of mixed	Any reduction from 1 site potential tree	<20 feet mixed native trees and	May et al. FW matrix

	riparian structure	native trees and shrubs (200 ft) no TIA*, no lawns, if site appropriate – emergent vegetation	height of mixed native trees and shrubs, 0-4% TIA, lawns within 120 feet of lake	shrubs, >4% TIA, lawns to shoreline	new shorelines rule
	Shoreline gradient	Natural gradient and substrate, no artificial armoring	Any bulkhead or structure that disrupts maintenance of a natural gradient in the riparian zone	Any bulkhead at or within the OHW line	

* Total Impervious Area